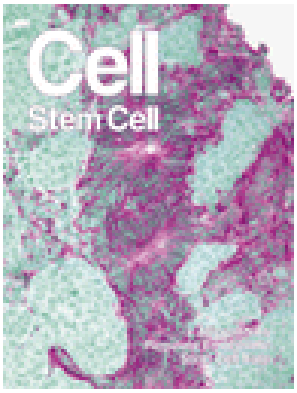
CALIFORNIA INSTITUTE FOR REGENERATIVE MEDICINE

Some Early Results from CIRM Grantees

Laura Elias & Arnold Kriegstein, University of California, San Francisco
Discovered that membrane proteins that form cell to cell connections also have an important role in controlling how neurons migrate in the brain. Understanding neuronal migration is a critical aspect of cell therapy in the nervous system, as replacement cells will need to be directed to their appropriate site of action. This research project is also an example of how funding work in one field moves along work in another. The membrane proteins highlighted in this report had previously been identified in some cancers, and these new observations in neurons provide rationale for targeting them in cancer therapy. The finding was featured as a Nature cover story on August 23, 2007.



Hanna Mikkola, University of California, Los Angeles
Discovered that blood stem cells originate and are multiplied in the placenta. Knowing this will help researchers to create the right environment for growing an individuals blood stem cells until there are enough for transplantation, something that has not been possible to date and forced many cancer patients to accept mis-matched cells that have a high chance of producing significant and often deadly complications. The study is published March 6, 2008 in the journal *Cell Stem Cell.*

Deepak Srivastava & Kathy Ivey, Gladstone Institute
Discovered how two specific tiny genetic factors called microRNAs influence the differentiation of stem cells into heart muscle. They found that the factors not only drive the versatile cells to become heart, but also actively prevent them from becoming other tissue such as bone adding to their potential to make therapy more specific and targeted for patients. The study is published March 6, 2008 in the journal *Cell Stem Cell.*

Miguel Ramalho-Santos, University of California, San Francisco
Identified a group of genes that are active in embryonic stem cells but not in more differentiated cells. Also developed a technique to find DNA regions that could be important for activating these genes, and identified a factor that directs the production of proteins from genes that contain these regulatory DNA regions. These studies will greatly inform research efforts that rely on maintaining a stem cell's ability to proliferate and to generate the many different cell types in a human body. Findings were published in the August 2007 PLoS Genetics.

Youngjun Kim, University of California, San Diego
Found the function of a key protein involved in the cell cycle, the process by which a cell duplicates all its genes and divides. The protein is critical to the assembly of the membrane around the cell's nucleus. A fundamental understanding of the cell cycle is integral to advancing all cell-based therapies. The findings were published in the April 17, 2007 Proceedings of the National Academy of Sciences.

Chay Kuo, University of California, San Francisco
Found that proteins involved in the generation of neurons early in development also help neural stem cells produce neurons after birth. Furthermore, the researchers identified a self-repair mechanism in the brain that relies on these neural stem cells. Understanding how endogenous neural stem cells repair and remodel a mature brain is critical to successful stem cell therapy. The findings were published in the December 15, 2006 issue of *Cell*.

Cynthia Kosinski, University of California, San Francisco
Found nearly a thousand genes that are expressed differently in different parts of the colon. The colon is constantly renewed via its own stem cells and understanding how these genes are expressed differently as the cells specialize will help understand what happens when this goes wrong as in colon cancer. The Findings were published in the September 25, 2007 Proceedings of the National Academy of Sciences.

William Lowry & Rupa Sridharan, University of California, Los Angeles
Succeeded in inducing skin cells to become pluripotent cells with genetic featured very much like embryonic stem cells. They verified work published during the completion of their project which showed that the introduction of four specific genetic factors is sufficient to induce differentiated adult cells into reverting to an embryonic stem cell-like state. This was critical validation of a procedure that could lead to a new way of developing personalized cell lines for therapy. The findings were published in the February 26, 2008 issue of the Proceedings of the National Academy of Sciences.